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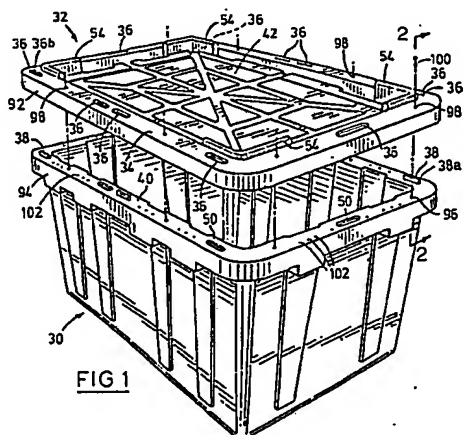
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⑤4 A container.

**(57)** A container is made up of a box (30) and a dished lid (32). Means (36, 38, 50) are provided to enable the lid (32) to be placed on the box (30) one way up or the other way up to give two different internal volumes of container. Preferably the means (38, 50) also enable two boxes (30) to be placed with their open ends together to make up a container having a third internal volume.



## Description

## A CONTAINER

This invention is directed to a container for use in the moving and storage industry.

The use of containers for the enclosure of items being moved or stored is commonplace. Containers provide convenience for organization and protection of goods during their moving and storage. Containers of a size and weight such that they can generally be carried by one or two people when loaded are widely available in a variety of sizes, shapes and material construction.

Containers commonly used for moving and storage suffer from many disadvantages. Cardboard boxes are generally weak and tend to buckle when being carried or when stacked one on top of another. They provide little protection of contents from water, fire, rodents, etc. Cardboard boxes lack resiliency and can often be used only once. Being susceptible to water damage they are difficult to clean for reuse. Cardboard containers often rely on the load bearing capability of contents to provide support for the stacking of other containers thereon.

Plastic containers in common use, while offering certain improved characteristics over cardboard boxes still suffer many disadvantages.

One severe disadvantage of commercially available containers is their lack of versatility, in use. Conventional containers generally have a fixed capacity. In order to obtain a different enclosed volume, it is generally necessary to obtain another container of different size.

The limitation of having to provide a different sized container in order to cater to different sized items or quantities thereof is highly disadvantageous. For instance, a manufacturer must manufacture, stock, and market various sizes of containers. End users also must stock different sizes. Inventory control becomes increasingly difficult with an increase in the number of different sizes of boxes which are stocked. Decisions regarding the size to be used on site must be made in advance in order to ensure availability of appropriately-sized containers for moving and storage. Automated washing of different sized boxes is more difficult than washing uniformly sized boxes. The stacking and organization of containers in storage is greatly complicated when various sizes of containers are used.

In addition, it is particularly awkward when a container is full and a little extra is left over which must be put into a new container. It would be advantageous to have a container the internal capacity of which could be expanded, if only by a small amount.

According to this invention a container comprises

- i) a box having a base, walls and a rim defining an open end;
- ii) a lid for the box, the lid being dished so that a first volume enclosed by the container in a first assembled orientation is larger than a second volume enclosed by the container in a second assembled orientation;
- iii) first and second mating means located on

the lid to permit the lid and box to mate in the respective assembled orientations;

iv) first lid rim portions which in the first assembled orientation abut outer wall portions of an above-stacked substantially identical second box in mated stacking relation; and,

v) second lid rim portions which in the second assembled orientation abut outer wall portions of an above-stacked substantially identical second box in mated stacking relation.

Preferably the box further comprises third mating means located at the open end of the box to permit the box to act as a lid in aligned, mated open-end-to-open-end relation with a substantially identical second box.

The present invention provides an improved container having a combination of features that provide versatility previously unavailable. The preferred arrangement enables the container to have any one of three predetermined capacities.

Preferably, containers regardless of their assembly mode, can be stacked one on top of the other.

In the preferred embodiment, box base face portions are provided with sets of ridges. Outer faces of the protruding ridge portions lie substantially in a plane parallel to the plane in which peripheral base face portions lie. The base face ridges are arranged such that mating can occur between an inverted box and a second box stacked on the inverted box.

The preferred embodiment also includes a lid which on one face is provided with projections in its peripheral regions, which projections abut the lower sides of a box stacked on top of the lid thereby providing a mating of the box and underlying lid. The dished second face of the lid has a countersunk central portion into which a lower portion of a box stacked thereover can fit in mating relation.

The preferred embodiment further provides that assembled container components can be secured regardless of the assembly mode of the container. In the preferred embodiment, for example, the box has holes in the rim and the lid has holes along its periphery. The respective holes of an assembled container are in aligned, unobstructed relation regardless of the assembly mode selected thus providing means for installation of securing devices through the holes for all three combinations.

The preferred embodiment further provides a container in which the box sides are provided with ribs.

The preferred embodiment further provides containers, the boxes of which nest into each other, having lids which also nest into each other.

Another preferred embodiment provides a container that, regardless of its assembly mode

provides rack support members, all assembly combinations being able to be accommodated on the same suitably dimensioned two rail rack.

Another preferred embodiment provides a substantially sealed container having hole-defining portions located externally of the enclosed volume of the container. Preferably when the box is inverted it sheds water. Preferably the box includes a peripheral rim and depending lip portions that can be gripped and manoeuvred from all sides.

Embodiments of containers in accordance with this invention will now be described with reference to the accompanying drawings; in which:-

Figure 1 is an exploded perspective view of a preferred embodiment comprising a box and lid;

Figure 2 is a view taken at 2-2 of Figure 1, having the lid in assembled relation with the box;

Figure 3 is a perspective view of a preferred embodiment comprising a box and a lid, with a phantom view of a box in stacked, superposed relation thereon;

Figure 4 is a view similar to Figure 3, having the box lid inverted;

Figure 5 is a perspective view of an inverted box with the lower portion of a superposed, canted box positioned for mating relation therewith;

Figure 6 is an exploded perspective view of a container comprising a lower box, beneath a mated box, in inverted canted relation thereover;

Figure 7 is a planar sectional end elevation of two nested boxes, the upper nested box being in mating assembled relation with a lid. The view of the lower of the two boxes is taken at 7-7 of Figure 3.

Figure 8 is a view similar to the top portion of Figure 7, showing the lid of Figure 7 in phantom, and also in an inverted position;

Figure 9 is an end elevational view of a container having two box portions in assembled mated relation; and

Figure 10 is an end elevational view showing the two boxes of Figure 5 in stacked mated relation.

Referring to Figure 1, an exploded view of a preferred embodiment comprising a box 30 and lid 32 is illustrated. The peripheral portion 34 of lid 32 has holes 36, therethrough, into which fit lug portions 38 of box rim 40. With lid facing 42 outwardly, the five lugs 38 (all of which can best be seen in Figure 6) can fit into one of the ten holes 36 depending on the direction of orientation of the lid 32. For example, lug 38a can fit into either hole 36a or 36b depending on the orientation of the lid. A sectional view of the lid with face 42 facing outwardly and lug 38 fitting through one hole 36 can be seen in Figure 7.

A second container assembly mode is obtained with lid face 42 oriented inwardly, that is, with lid face 44 facing outwardly, as illustrated in Figure 4. In a

fashion corresponding with the way the box and lid mate when lid face 42 faces outwardly, there are two horizontal orientations in which the box and lid can be assembled with lid face 44 facing outwardly. Although it cannot be seen in Figure 4, the five lugs 38 fit into five of the ten holes 36 when the lid face 44 faces outwardly. Thus, in all instances the lid can be applied indiscriminately, in fitting closing relation with a box. A sectional view of lid 32 on box 30 with lid face 44 facing outwardly can be seen in Figure 8. Lug 38 is visible.

As illustrated in Figure 7 the enclosed volume of an assembled container is related to internal height 46 provided for example; when lid face 42 is facing outwardly. In a second assembly mode with the lid 32 inverted, the internal height 46 is increased by an internal height difference 48 which represents the extent of "dishing" of the lid 32, as indicated in Figure 8 wherein the first assembly mode is shown partially in phantom.

Illustrated in Figure 6 is a third container preferred embodiment in which a third enclosed volume is obtained, by the arrangement of two boxes 30 and 30d as shown in Figure 6 and also Figure 9. Mating relation is obtained wherein respective lugs 38 fit into holes 50 of the box rims 40 of each box 30 and 30d.

The central portion of lid face 42 defines a dished countersink 52 most easily seen in Figures 2 and 7. The countersunk lid portion 52 has aligning corners 54 which substantially abut in mating relation lower portions of box sides 56 of an upwardly stacked box 30a (in phantom) as illustrated in Figure 3. Thus, with the lid oriented with face 42 outwardly, another box 30a will stack and mate on top.

Peripherally located on lid face 44 are teeth 55. When lid face 44 is oriented outwardly as shown in Figure 4 box sides 56 of a superposed stacked box 30b (shown in phantom) abut the teeth 55 for mating and stacking.

Turning to Figure 5, located on base face 58 are sets of ridges 60. The ridges are arranged such that the interaction between abutting ridge sides results in mating of boxes 30c and 30 in stacking relation.

Located on base face 58 are sets of ridges 60. The ridges are roughly grouped into triangular quadrants divided by crossing ribs 62 placed on the box for strength. Crossing ribs 62 are roughly one-half the height of the ridges 60. The ridges 60 are offset from each other when the boxes are mated base to base so that the bases are interlocked by abutting ridges from the box above as can be best seen in Figure 10. Each ridge 64 extends to the base face 58 of the box against which it is stacked.

The ridge pattern is such that any triangular quadrant, when rotated 180°, about polar axis 66, is identical to the triangular quadrant opposite it. Thus ribs 68 and 68' are identical, and as well, respectively ribs 70 and 70'; 72 and 72'; 74 and 74'; 76 and 76' and 78 and 78' and 80 and 80'. The other two quadrants have a similar relationship with each other.

As mentioned opposite ridges 68 and 80', 70 and 78', 72 and 56', 74 and 74' 76 and 72', 78 and 70', and 68' and 80 are offset from each other to allow for mating. Thus, ridge sides 82 and 82', where 82' is out

of view in Figure 5, about to align and mate boxes 30 and 30c.

Rotation of a given box base about polar axis 66 in Figure 5 by 180° results in a repetition of the pattern on the base. This allows box 30 and box 30c to be stacked base to base in the orientation shown in Figure 5 or in a relationship in which box 30c is rotated 180°. That is, in Figure 5, second box 30 mates with box 30c before or after translation of box 30c by 180° about polar axis 66. It is contemplated that such spatial relationships can be obtained using topographical features other than ridges and including other relief features which interlock the boxes.

As shown in Figure 4 ribs 84 are provided integral with the walls of the preferred embodiment to provide a stiffening buttressing effect.

The dished or countersunk portion 52 of lid 32 is formed with rib-like contour features 86 shown in Figure 8 which increase lid resistance to buckling, in use.

Provided at upper portions of ribs 84 and below box rim portion 40 and contiguous to both are flange portions 88. Box 30 regardless of assembly mode can be supported on racks 90 as illustrated in Figure 3 or racks 92 as illustrated in Figure 4.

As shown in Figure 7, box lid 32 includes a rim portion 92, and box 30 also includes a downturned lip portion 94. As shown in Figure 8, box lid 32 includes an additional rim portion 95.

Referring to Figures 6 and 1, the box 30 is provided with holes 96 and lid 32 is provided with holes 98 which align regardless of assembly mode, when a container is assembled in mating relation, to provide means for installation of securing devices such as barbed fastener 100 shown in Figure 2.

The preferred embodiment of box 30 is further provided with holes 102 through which can flow water when the box 30 is inverted.

The preferred embodiment of box 30 has dimensions such that box 30e nests into box 30 as illustrated in Figure 7. This provides a nesting of more than 80%.

Lids of the preferred embodiment nest into each other. This is not illustrated.

## Claims

### 1. A container comprising:

i) a box (30) having a base (58), walls and a rim (40) defining an open end;

ii) a lid (32) for the box, the lid (32) being dished so that a first volume enclosed by the container in a first assembled orientation is larger than a second volume enclosed by the container in a second assembled orientation;

iii) first and second mating means (36) located on the lid to permit the lid and box to mate in the respective assembled orientations;

iv) first lid rim portions (34) which in the first assembled orientation abut outer wall portions of an above-stacked substantially identical second box in mated stacking

relation; and,

v) second lid rim portions (55) which in the second assembled orientation abut outer wall portions of an above-stacked substantially identical second box in mated stacking relation.

2. A container according to claim 1, in which the box further comprises third mating means (38, 50) located at the open end of the box to permit the box to act as a lid in aligned, mated open-end-to-open-end relation with a substantially identical second box.

3. A container according to claim 2, wherein the third mating means (38, 50) cooperate with the first and/or second mating means (36).

4. A container according to claim 3, wherein the third mating means (38, 50) comprise projections and holes and wherein the first and second mating means comprise holes (36).

5. A container according to claim 2, 3 or 4, wherein the base of the box has an outer face with fourth mating means (60) for mating with the fourth mating means of a substantially identical second box.

6. A container according to claim 5, in which the fourth mating means (60) comprise raised face topography which mates with the raised face topography on the base of a second substantially identical box.

7. A container according to claim 6, in which the topography has a symmetrical spatial relationship such that rotation of the box by 180° in a plane substantially parallel to that defined by the box base still permits mating with the second box.

8. A container according to claim 6 or 7, in which the topography comprises raised ridge elements (68-80) arranged in triangular quadrants so that the ridge elements (68-80) of the box abut against the edges of a second substantially similar box when mated base-to-base to mutually lock the bases (58) from relative movement with each other in any direction in a plane substantially parallel to the box base.

9. A container according to any one of the preceding claims, wherein the first lid rim portions (54) comprise upstanding projections on a first face of the lid (32) and lid rim portions (55) comprise upstanding projections on a second face of the lid (32).

10. A container as claimed in any preceding claim, in which the box (30) has holes (96) in the rim (40) and the lid (32) has holes (98) along its periphery so placed that in the assembled container the respective holes are in aligned, unobstructed relation regardless of the assembly mode selected thus providing means for installation of securing devices (100) through the holes (96, 98).

11. A container as claimed in any preceding claim, in which the lid (32) nests with a substantially similar second lid (32), and the box (30) nests with a substantially similar second box (30).

12. A container according to any preceding claim, in which the box (30) has rack support members (88) on at least two opposite sides having shoulders to support the box on a two rail rack.

13. A container as claimed in any preceding

claim, in which the box (30) has depending lip portions (94) that can be gripped by a user and in which the box (30) when inverted sheds water.

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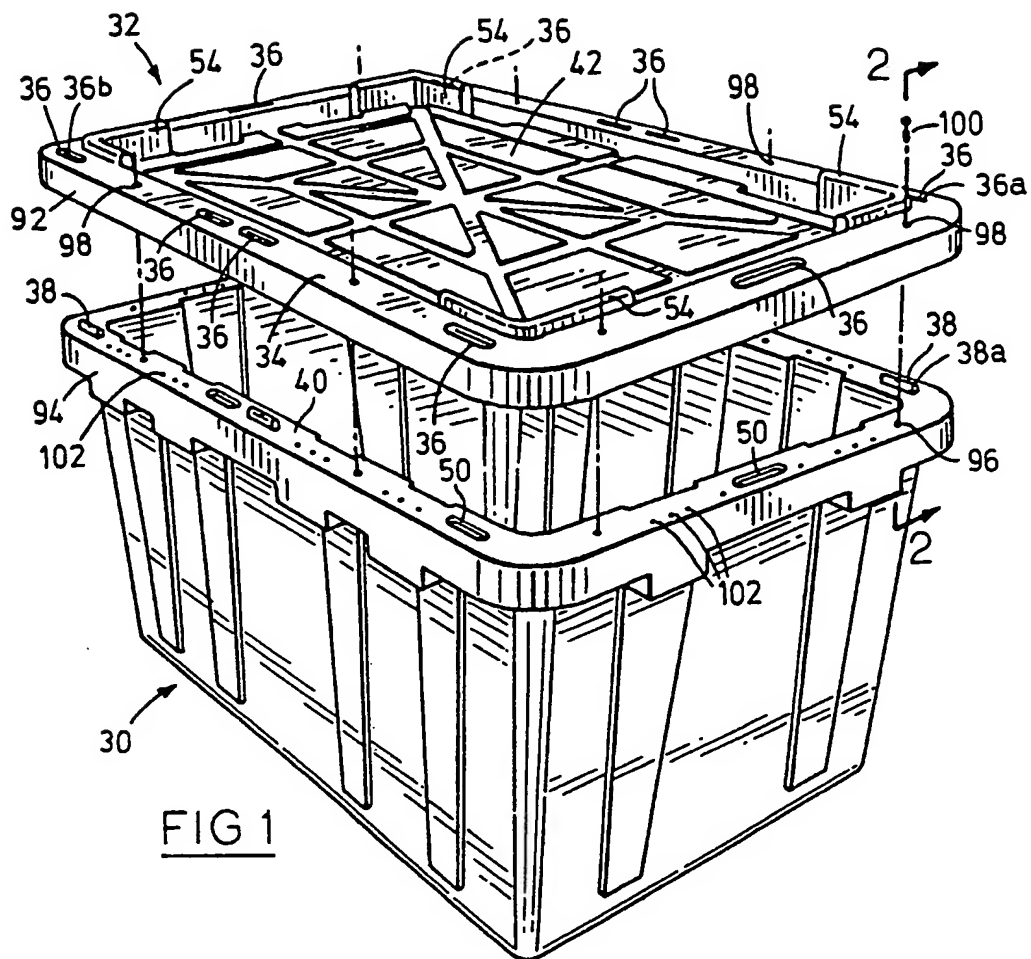


FIG 1

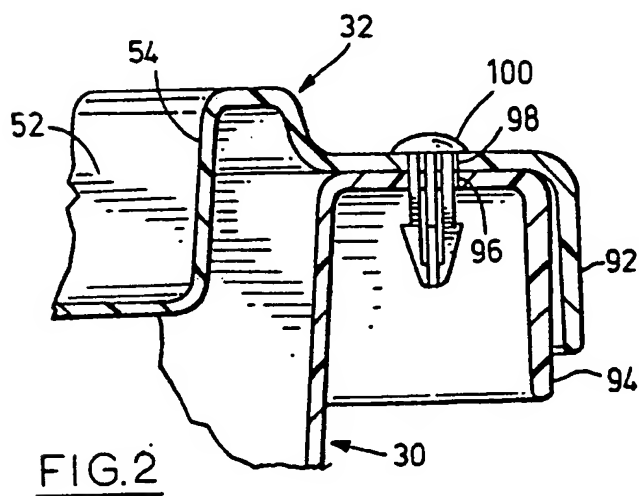
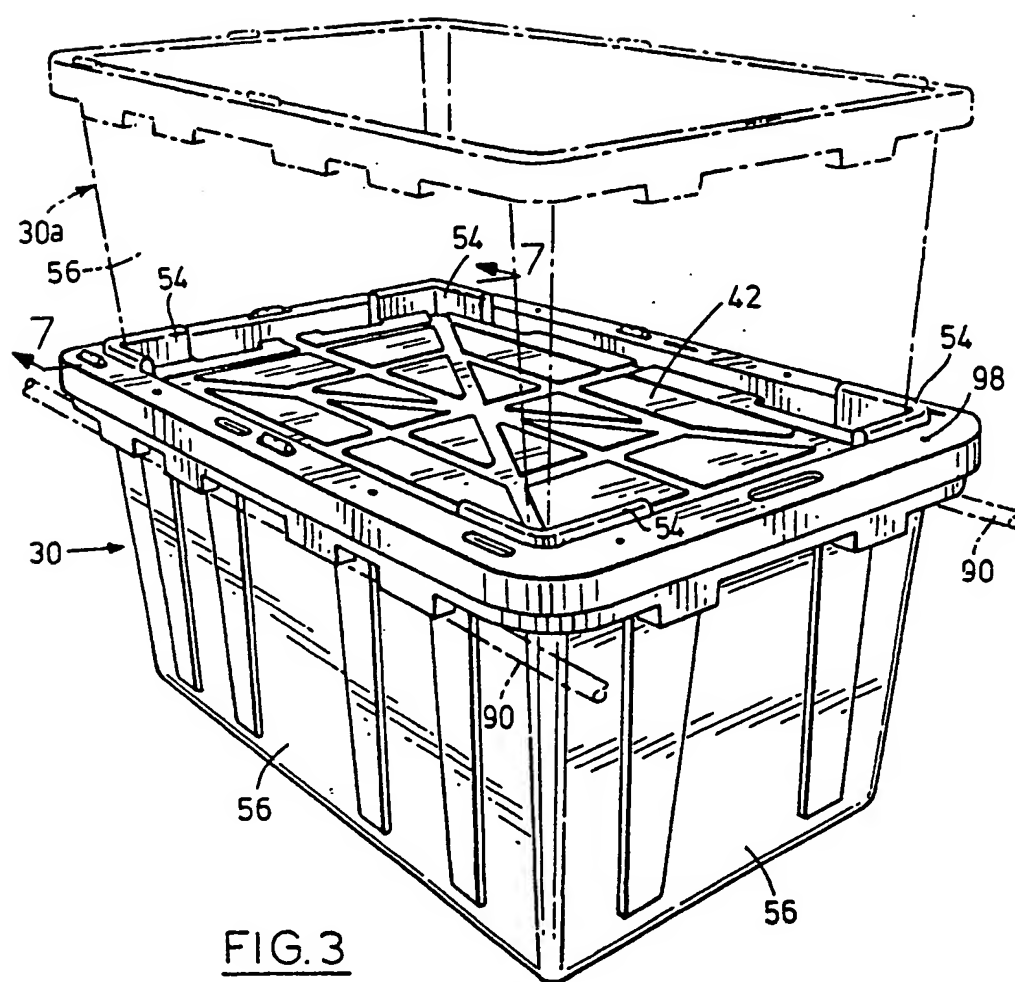


FIG. 2



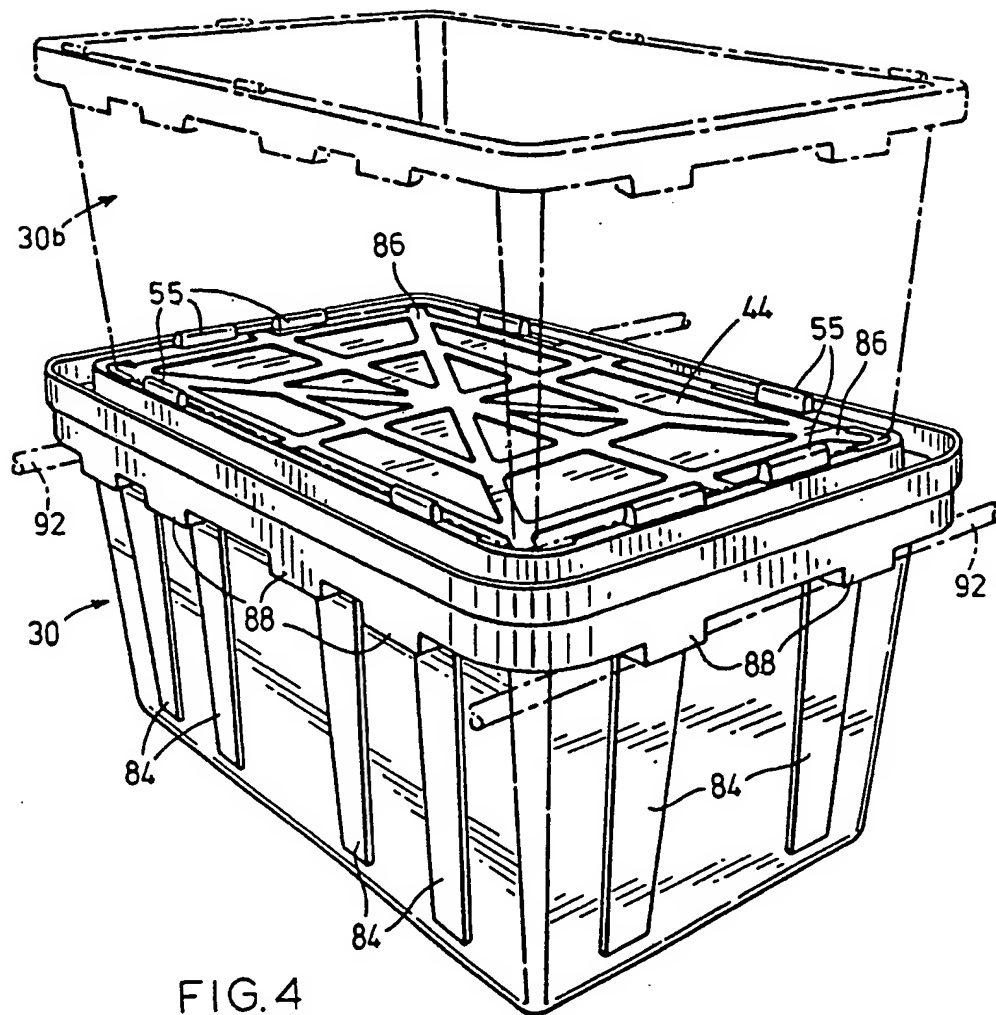
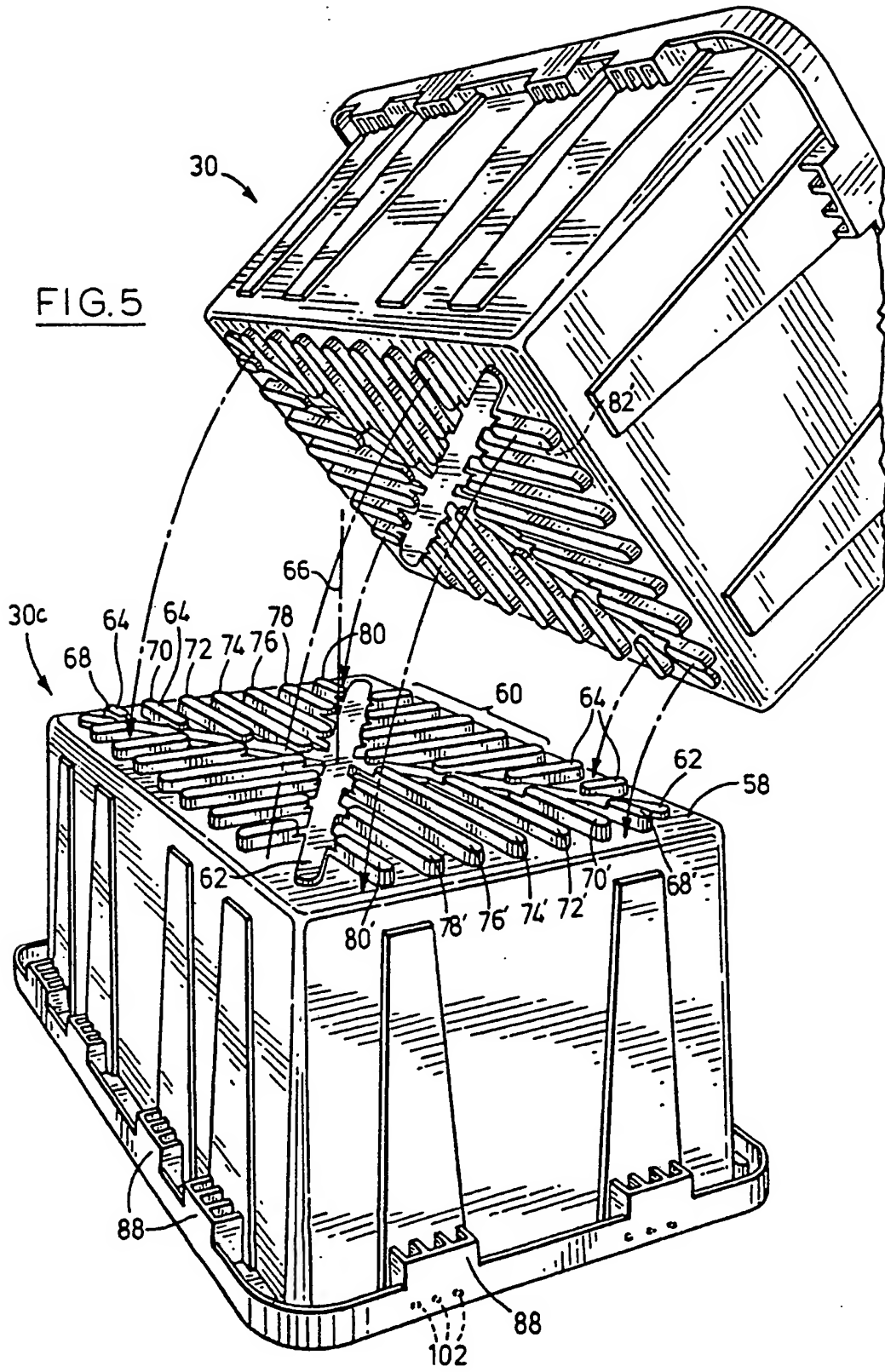
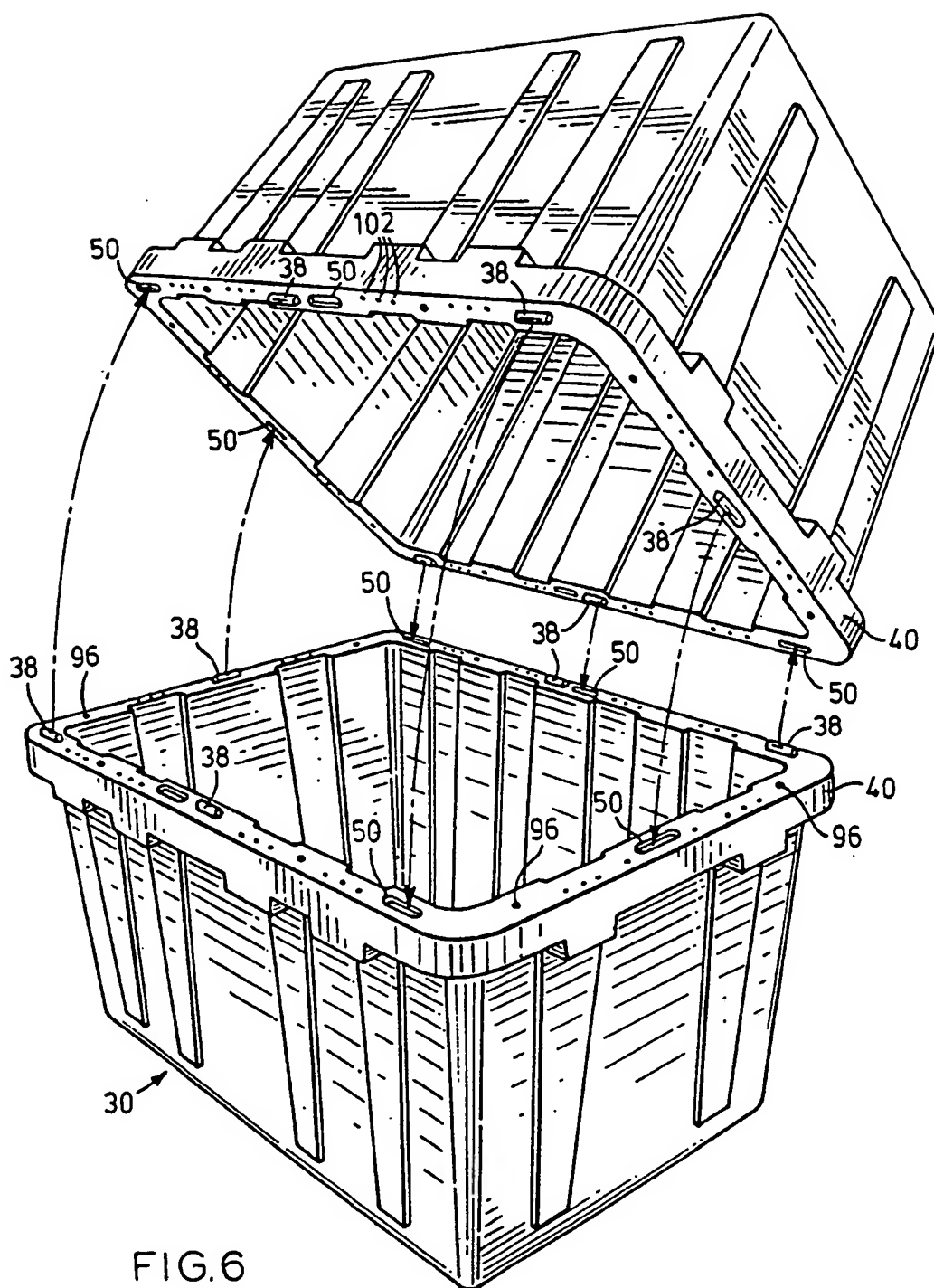
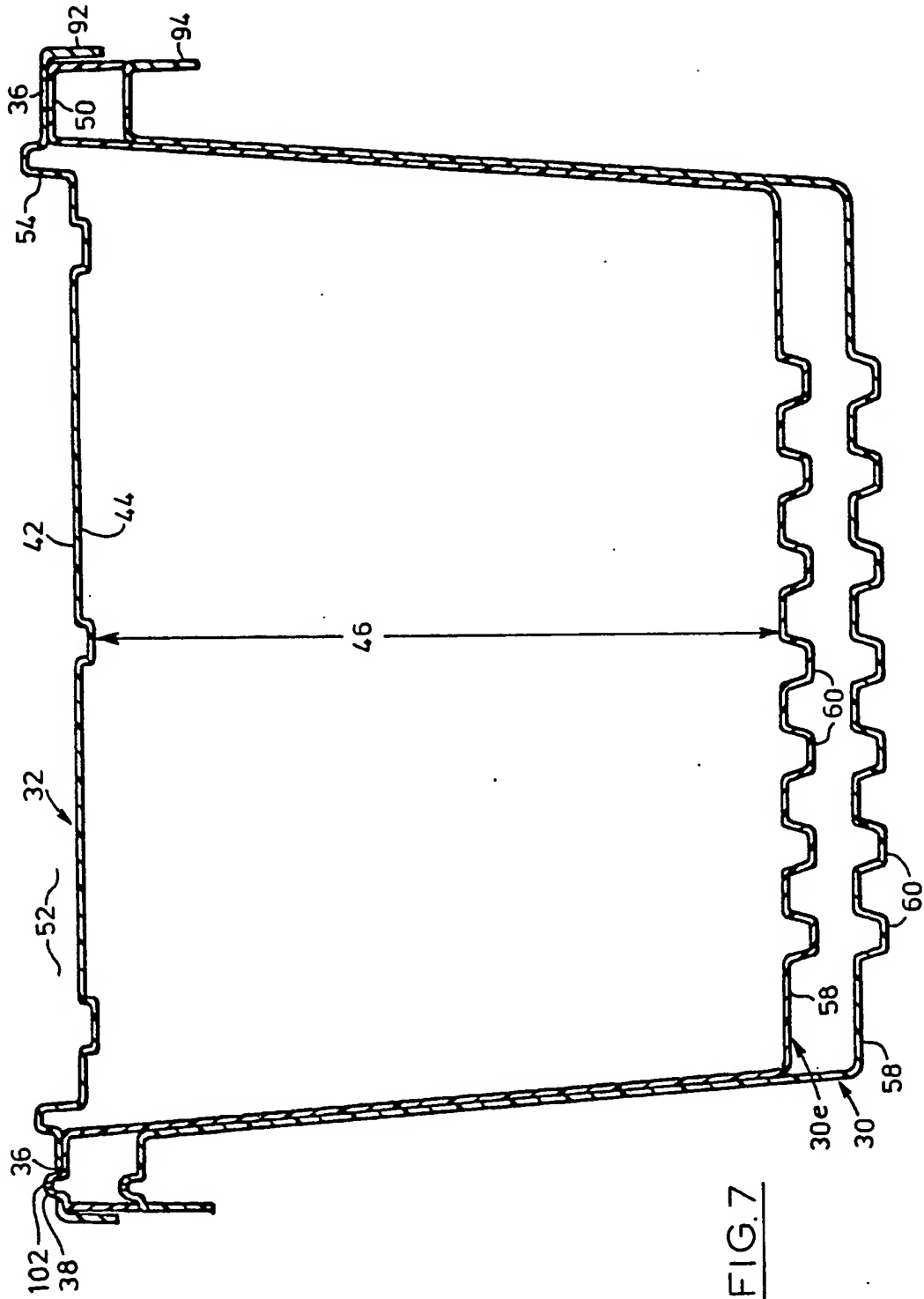




FIG. 5







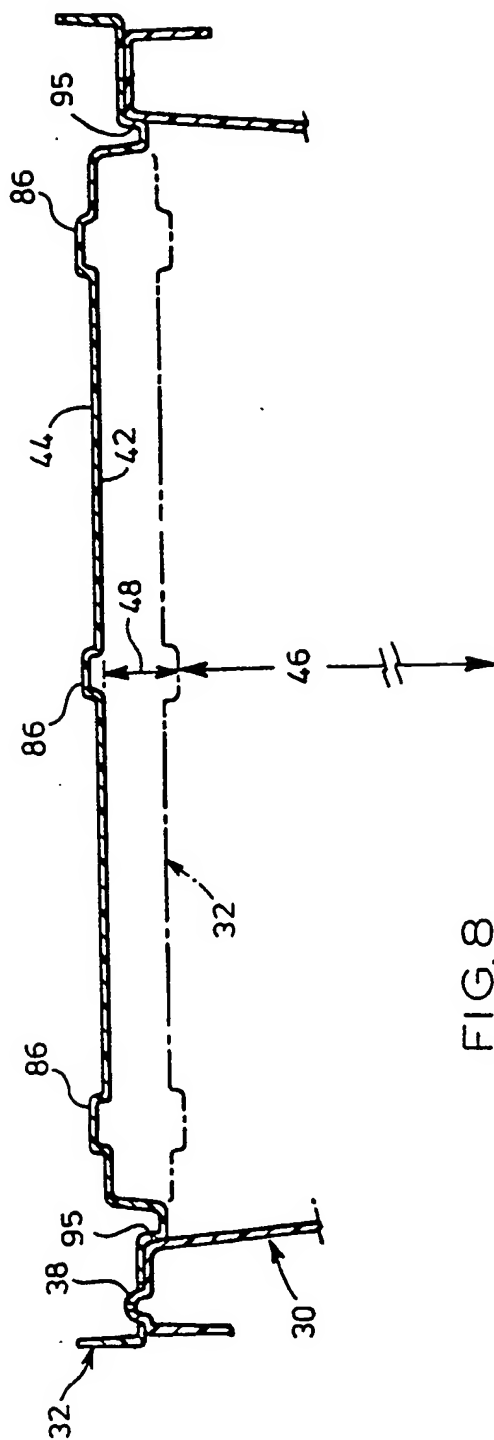


FIG. 8

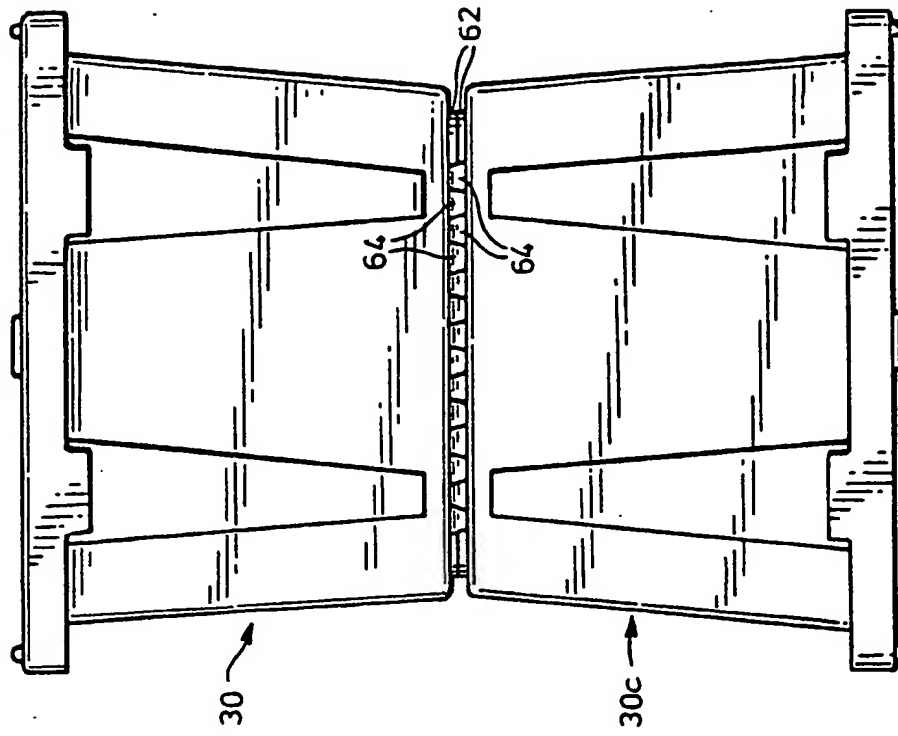


FIG. 10

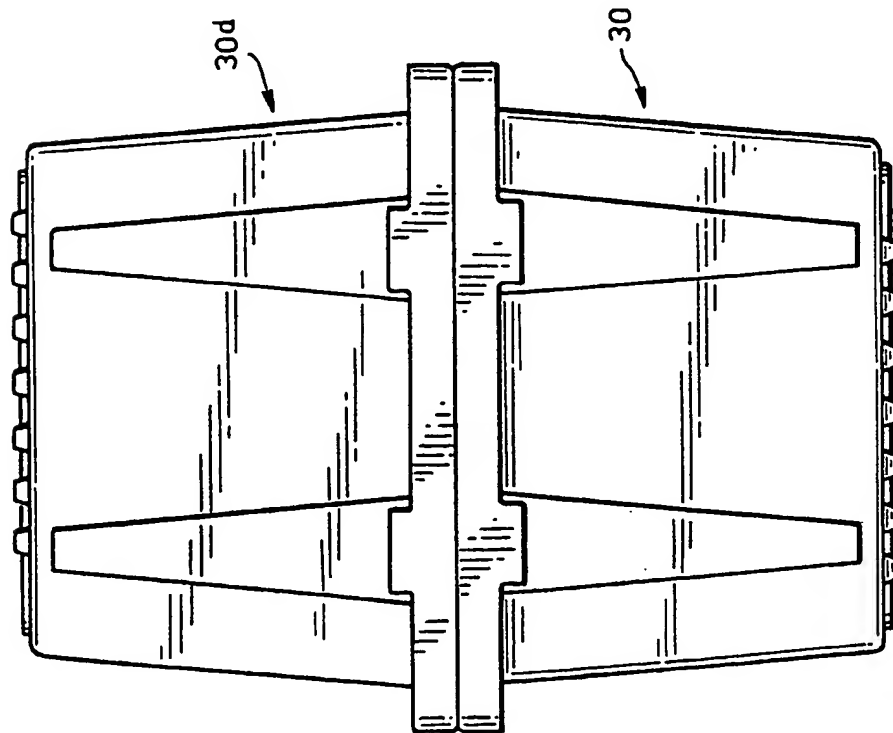


FIG. 9



European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number

EP 89 30 1783

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-4 523 692 (LEMKIN) * Column 4, lines 10-62; column 5, line 42 - column 6, line 13; figures *	1,10	B 65 D 21/02
Y	---	2-7	
Y	FR-A-2 170 242 (GEORG UTZ AG) * Page 2, line 1 - page 3, line 14; figures * -----	2-7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30-05-1989	Examiner CLARKE A. J.
<b>CATEGORY OF CITED DOCUMENTS</b>			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : Intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	